# Activity #13: Math (Teacher version)
## Comparing Reaction Times in Three Sports

***Note to students*: Lab teams of two or three students are required for this activity.**

**softball**

**baseball**

**tennis**

**National Standards addressed:**

**Content Standards:**
**Algebra Expectation: Students will draw reasonable conclusions about a situation being modeled.**
**Geometry Expectations: Students will analyze properties and determine attributes of two- and three- dimensional objects; students will draw and construct representations of two- and three- dimensional geometric objects using a variety of tools.**
**Measurement Expectations: Students will make decisions about units and scales that are appropriate for problem situations involving measurement; students will analyze precision, accuracy, and approximate error in measurement situations; students will understand and use formulas for the are, surface area, and volume of geometric figures.**

**Process Standards:**
**Communication Expectations: Students will organize and consolidate their mathematical thinking through communication; students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.**
**Connection Standard Expectation: Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.**

***Purpose*:** **To compute speed in meaningful way by applying rules of ratios**
**To compare reaction times in three different sports**
**To develop an understanding of the need for math in real-world activities**
**To practice with the properties of ratio**

***Materials*: calculator**

**This activity is an adaptation and extension from the *Mathematics Teacher*, March 2002.**

***Activity Procedure*:**

**1. Investigate the speed of a softball pitch. In the Olympics, a typical pitch can be thrown at 65 mph. Show all work.**

**a. First, find how fast a softball thrown at that speed will cross home plate in feet per second.**

**b. Determine how long it will take for the softball to reach home plate, if home plate is 40 feet from the pitcher's mound.**

**(The softball travels at $\frac{95\frac{1}{3}\ feet}{1\ second}$. It will reach home plate in about .420 seconds.)**

**2. Investigate the speed of a baseball pitch. In the Olympics, a typical pitch can be thrown at 90 mph. Show all work.**

**a. First, find how fast a baseball thrown at that speed will cross home plate in feet per second.**

**b. Determine how long it will take for the baseball to reach home plate, if home plate is 60.5 feet from the pitcher's mound.**

**(The baseball travels at $\frac{132\ feet}{1\ second}$. It will reach home plate in about .458 seconds.)**

**3. Investigate the speed of a tennis ball. In pro tennis, a typical serve can be traveling 105 mph. Show all work.**

**a. First, find how fast the tennis ball is served in feet per second.**

**b. Determine how long it will take for the tennis ball to reach the opposite baseline, if the baselines are 78 feet apart.**

**(The tennis ball travels at $\frac{154\ feet}{1\ second}$. It will reach the opposite baseline in about .506 seconds.)**

***Analysis*:**

**1. Compare answers. Decide which player must react more quickly to the ball and explain why.** _____

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**2. Did you expect this result? Why or why not?** _____

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*Extension:*

**What sport do you play? Do a similar analysis on that sport, if possible.**

**The following web sites and articles provide enrichment and support for this activity:**

1. ***Mathematics Teacher*, March 2002.**
2. http://www.riverdeep.net/current/2001/03/031201_mit.jhtml
3. http://wings.avkids.com/Curriculums/Tennis/ballspeed_howto.html
4. http://www.newsearching.com/baseball/9__Speed_Sensor_Baseball_from_Markwort.html
5. **Activity #8, World's Largest Math Event 8, April 26, 2002, copyright ©2002 by the National Council of Teachers of Mathematics.**